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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/587,583	07/28/2006	Jonathan Hughes	000444-001	9687
94799 7590 09/24/2010 Law Office of Shruti Costales, PLLC 2020 Pennsylvania Avenue NW #310 Washington, DC 20006				
EXAMINER ARIANE, KADE				
ART UNIT		PAPER NUMBER		
1651				
NOTIFICATION DATE		DELIVERY MODE		
09/24/2010		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

shruti@shrutilaw.com  
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### Office Action Summary

**Application No.**

10/587,583

**Applicant(s)**

HUGHES ET AL.

**Examiner**

KADE ARIANI

**Art Unit**

1651

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 July 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3, 5-21 and 23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-21 and 23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/GS/US)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date \_\_\_\_\_

***DETAILED ACTION***

The amendment filed on July 06, 2010, has been received and entered.

Claims 1-3, 5-21 and 23 are pending in this application and were examined on their merits.

***Claim Objection***

The objection to Claim 1 is withdrawn.

***Double Patenting Rejections***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438,

164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-3, 5-21, and 23 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 9, and 12-20 of Hughes (US application No. 10/523302). Although the conflicting claims are not identical, they are not patentably distinct from each other because;

Claims 1, and 9-20 of Hughes are drawn to a process comprising the steps of forming a fermentation product at a temperature of at least 50°C ((i) to (ii)), and subjecting the mixture to one or more separation stage, separating the fermentation product from the broth by employing one or more flocculation agents ((ii) and (viii)), introducing cationic and anionic polymers into the mixture (claim 17), swellable clays and silica based materials (claim 13), solid by-product is lignin and analogous material (claim 19), and fermentation product is ethanol, glycerol, and amino acids (claim 20).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to use the process disclosed by of Hughes to provide a process of separating suspended solids from a fermentation liquor by subjecting the liquor to a solids-liquid separation stage.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 5, 17, 18, 20, 21 and 23 are rejected under 35 U.S.C. 102(e) as being anticipated by Scheimann (US Patent No. 7,566,469 B2).

Scheimann discloses a process of separating suspended solids from a fermentation liquor by subjecting the liquor to a solids-liquid separation stage wherein the fermentation liquor is produced in a fermentation process for the production of a fermentation product, in which the liquor has been subjected to a temperature of at least

50°C, wherein the solid-liquid separation stage is assisted by a treatment system, the treatment system comprises an anionic polymer formed from at least 50% by weight anionic monomer units which anionic monomer units are selected from the group consisting of (meth) acrylic acid and salts, the fermentation liquor is subjected to a distillation stage in which the product is recovered as a stillage stream and then subjected to the solids-liquid separation stage, the fermentation liquor comprises lignin in which separated solids are dewatered and then subjected to drying stage to provide a dry solid material that is used as a solid fuel, the fermentation liquor is derived from crop sugars in which separated solids are dewatered and then subjected to drying stage to provide a dry solid material that is used as animal feed (a method of dewatering corn stillage solids comprising adding to the solids an effective coagulating and flocculating amount of an anionic copolymer comprising acrylic acid sodium salt and separating the water, anionic polymer is formed using 20-60 percent by weight monomers, corn for fuel ethanol production which contains non-starch components of the grains, protein, germ hull & fiber, and the dried solids are used to manufacture animal feed) (Abstract, column 4 lines 44-45, column 1 lines 15-25). It must be noted that corn hull fiber is composed of lignin, cellulose and hemicellulose, and that the fermentation liquor from which corn stillage is obtained has been subjected to a temperature of at least 50°C. Scheimann discloses the anionic polymer exhibits intrinsic viscosity of at least 4 dl/g (about 15 dl/g to 40 dl/g) (Column 5 lines 9-12), the fermentation liquor is subjected to a mechanical dewatering step and a centrifugation step (dewatering centrifuges are used for removing a portion of solids from thick stillage) (column 1 lines 23-25). Scheimann discloses

treating thick slop or whole stillage from a bourbon production facility and treating stillage stream from fuel grade ethanol production facility with the anionic polymer (column 6 Example 1 and Example 3), and fermentation liquor for producing ethanol (column 1 line 16).

Scheimann therefore clearly anticipates the claimed method.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 5, 10, 17-21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scheimann (US Patent No. 7,566,469 B2) in view of Wall et al. (Journal of Agricultural & Food Chemistry, July-August 1983, p.770-775).

As mentioned immediately above, Scheimann teaches the limitations of claims 1, 2, 5, 17, 18, 20, 21 and 23. Scheimann teaches anionic polymer is formed using 20-60 percent by weight monomers (column 4 lines 44-45), and adding 100, 200, 300 ppm of the anionic polymer to a fermentation liquor (column 6 Example 1 and Table 1). Scheimann teach the effective dose of the anionic polymer can be optimized to obtain a proper polymer/particle interaction (column 5 lines 40-45).

Scheimann does not teach the treated liquor form which suspended solids have been removed are recycled and used in wash water. However, Wall et al. teach recycling the fermentation liquor (aqueous solubles) separated from a fermentation process and using it for mashing (Abstract). Wall et al. teach major cost and source of energy consumption during alcohol production from fermentation of corn are evaporative concentration and drying of distillers solubles (Abstract). Wall et al. also teach recycling reduces concentration costs and appears to accelerate fermentation (Abstract and p.770 2<sup>nd</sup> column 3<sup>rd</sup> paragraph lines 1-5).

Therefore, a person of ordinary skill in the art at the time the invention was made would have been motivated to recycle and use the treated liquor form which suspended solids have been removed in the method as taught by Scheimann according to the teachings of Wall et al. The motivation as taught by Wall et al. would be to reduce the cost. Moreover, the determination of the monomer units (in % by wt.) to form the anionic polymer and the dose of the anionic polymer to be added to the fermentation liquor in the method as taught by Scheimann, would have been a matter of routine optimization said person knowing that Scheimann teach anionic polymer is formed using 20-60 percent by weight monomers and adding 100, 200, 300 ppm of the anionic polymer to a fermentation liquor, and the effective dose of the anionic polymer can be optimized to obtain a proper polymer/particle interaction.

Claims 1-2, 5-9, 11-18, 20, 21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scheimann (US Patent No. 7,566,469 B2) in view of Moffett



(US Patent No. 6,132,625) and further in view of Coffey et al. (US 2003/0155091 A1) and of Ovenden et al. (Colloids and surfaces A: Physicochemical and Engineering Aspects, 2002, Vol. 197, p.225-234).

As mentioned immediately above, Scheimann teaches the limitations of claims 1, 2, 5, 17, 18, 20, 21 and 23.

Scheimann does not teach the treatment system further comprises a cationic polymer, the anionic polymer and cationic polymer are added sequentially, the dose of cationic polymer is at least 50 grams per tonne, and the treatment system further comprises addition of a siliceous material. However, Moffett teaches using a mixture of anionic polymers and cationic polymers to process the liquid stream containing biosolids, also to separate solids (biosolids) from the aqueous stream of distilleries, wet-milling plants of grains (column 2 lines 35-41, column 3 lines 10-15, and col. 7 lines 4732-59). Moffett teaches the combination of the polymers when contacted with the aqueous stream produced flocculated biosolids, which can be separated, recovered and used in numerous applications (col. 7 lines 18-25). Moffett teaches biosolids with charged particles of colloidal size such as proteins the gravitational forces are insufficient to cause them to settle out of the aqueous suspension and filtration is ineffective to separate these protein solids, their recovery is low and the stream may not be environmentally acceptable for discharge (col. 1 lines 36-44). Moffett also teaches it is desirable to maximize the size of the flocculated material produced in order to facilitate removal of this material from the stream (col. 2 lines 63-67). Moffett teaches cationic polymer is selected from polyamines (col. 5 lines 36-37). (It must be noted that

because the cationic polymer taught by Moffett is polyamines same as the claimed cationic polymer therefore it must exhibits the claimed charge density and intrinsic viscosity). Moffett also teaches the treatment system further comprises addition of a siliceous material, anionic microparticulate siliceous material (polyaluminosilicate microgels) and also teaches silica-based bentonite clay (col.3 lines 41-49, and col. 4 lines 30-31). Moffett teaches the anionic polymer and cationic polymer are added to the stream in any sequential order (col. 6 lines 65-67). Moffett teaches cationic polymer is added from about 0.2 to 5000 ppm based on the solution weight (col. 5 lines 8-10). Moffett further teaches the amount of cationic and anionic polymers polymer must be in an effective amount to produce flocculated biosolids (col. 5 lines 6-10). Moffett also teaches the effective amount of polymer (dose) to be added to the aqueous stream which comprises solids (biosolids) must be enough to neutralize the surface charges of the solids in the aqueous stream, and the effective amount depend on the several factors including the surface charges present on the biosolids in the aqueous stream, the type of biosolids, and the pH of the aqueous stream, and the effective amount can be determined by means of available and known methods to those skilled in the art (col. 5 lines 16-25 and 50-55). Therefore, a person of ordinary skill in the art at the time the invention was made would have realized that the dose, the type of the polymers and the charge density and intrinsic viscosity of the polymer used in a solid-liquid separation system could have been optimized using the known methods.

Moreover, Coffey et al. teach siliceous material saponite, and using siliceous material to remove suspended solids (p. 6 0076).

Further motivation is in Ovenden et al. who teach the flocculation efficiency is improved because of the synergy between cationic polymers (CM) and anionic polymers (Abstract). Ovenden et al. teach synergy reduced the amount of linear polymer required for effective flocculation and allow systems to be valid in wide pH range and resistant to shear force (p.234 1<sup>st</sup> column 3<sup>rd</sup> paragraph). Ovenden et al. teach selection of a suitable flocculation system for a specific application largely depends on the chemistry of the system and flocculation mechanism (p.226 2<sup>nd</sup> column 1<sup>st</sup> paragraph).

Therefore, a person of ordinary skill in the art at the time the invention was made, recognizing the presence of charged solids (biosolids) in the fermentation liquor that could not be effectively separated, would have been motivated to apply the prior art teachings and to add a cationic polymer and a siliceous material to the anionic polymer in method as taught by Scheimann according to the teachings of Moffett and Coffey et al. in order to provide an improved process of separating suspended solids from a fermentation liquor with a reasonable expectation of success in flocculating the suspended solids. Because Moffett teaches the combination of the polymers when contacted with the aqueous stream produced flocculated biosolids, which can be separated, recovered and used in numerous applications he motivation would be to improve the efficiency of water removal (dewatering), and to lower the cost and energy of the process, and because Coffey et al. teach siliceous material saponite, and using siliceous material to remove suspended solids. Moreover, the determination of the concentration (g/dl) of the cationic polymer (intrinsic viscosity is a function of the

concentration of the polymer) and the dose of the anionic polymer to be added in the method as taught by Scheimann would have been a matter of routine optimization said person knowing that Moffett teaches cationic polymer is added from about 0.2 to 5000 ppm based on the solution weight, and the amount of cationic and anionic polymers polymer must be in an effective amount to produce flocculated biosolids.

### ***Answer to Arguments***

Applicant's arguments with respect to claims 1-3, 5-21 and 23 filed on 07/06/2010, have been fully considered but are not persuasive.

With respect to the nonstatutory double patenting rejection, Applicant states (p.6 6<sup>th</sup> paragraph of Remarks of 07/06/2010) that the submitting of any terminal disclaimers will be done once the present claims are in condition for allowance. Therefore, nonstatutory double patenting rejection is maintained.

With respect to the rejection of claims 1, 2, 5, 17, 18, 20, 21 and 23 under 35 U.S.C. 102(e) as being anticipated by Scheimann. Applicant argues (page 8 3<sup>rd</sup> paragraph of the Remarks of 7/06/2010) that Scheimann does not disclose or suggest a fermentation liquor that has been subjected to a temperature of at least 50°C which is then treated with an anionic polymer as recited in claim 1. This argument has been considered however is not found persuasive because Scheimann discloses subjecting stillage (stillage resulted from the fermentation of corn, rice, ... produced during the

manufacturing food and fuel grade ethanol paragraphs 0002, 0013 and 0014) to the solid-liquid separation treatment. It must be noted that a person of ordinary skill in the art at the time the invention was made would have known that stillage as disclosed by Scheimann has been subjected to a temperature of at least 50°C, since during production of ethanol from corn fermentation the temperature is elevated to 90°C (see p. 771 1<sup>st</sup> column 2<sup>nd</sup> paragraph of Wall et al. cited above),

Moreover, according to the specification (page 6 2<sup>nd</sup> paragraph lines 6-13) the fermentation liquor has been subjected to a temperature of at least 50°C is stillage. Therefore, Scheimann discloses and suggests a fermentation liquor that has been subjected to a temperature of at least 50°C which is then treated with an anionic polymer as recited in claim 1. The rejection is maintained.

For the reasons mentioned immediately above, because Scheimann discloses a fermentation liquor that has been subjected to a temperature of at least 50°C which is then treated with an anionic polymer as recited in claim 1, the rejection of claims 1-3, 5, 10, 17-21 and 23 under 35 U.S.C. 103(a) as being unpatentable over Scheimann, and the rejection of claims 1-2, 5-9, 11-18, 20, 21 and 23 under 35 U.S.C. 103(a) as being unpatentable over Scheimann are maintained.

### ***Conclusion***

No claims are allowed.

**THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kade Ariani whose telephone number is (571) 272-6083. The examiner can normally be reached on IFP.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Wityshyn can be reached on (571) 272-0926. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you

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have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kade Ariani  
Examiner  
Art Unit 1651

/Leon B Lankford/  
Primary Examiner, Art Unit 1651